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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,116	11/20/2003	Norihiro Dejima	S004-5155	9902

7590 12/07/2004

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EXAMINER

DUPUIS, DEREK L

ART UNIT PAPER NUMBER

2883

DATE MAILED: 12/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/718,116

Applicant(s)

DEJIMA ET AL.

Examiner

Derek L Dupuis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 13-20 is/are rejected.
- 7) ☒ Claim(s) 1,3 and 7-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities: the limitation “spaced at non-equal intervals” does not specify whether the interval being measured is parallel or perpendicular to the optical axis of the optical fiber. The examiner has assumed that the applicant is referring to a distance between the optical axes.

Appropriate correction is required.

2. Claim 3 is objected to because of the following informalities: “substantially equal to a the length” in line 12 of the claim should apparently be “substantially equal to the length”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 2 recites the limitation "the plurality of optical fibers" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. The independent claim upon which claim 2 is based only teaches first, second, and third optical fibers. Obviously, three optical fibers cannot possibly “comprise” a fourth optical fiber.

6. Claim 2 recites the limitation “a fourth optical fiber having a tip portion disposed approximately along a straight line”. The claim does not specify what points make up the line. The only point specified is the tip portion of the fourth optical fiber. If the applicant

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intended for the tip portion of the fourth optical fiber to lie along the same line claimed in claim 1, then the claim should be re-written to reflect this.

7. Claim 2 recites the limitation "the beam emitted from the fourth optical fiber". There is insufficient antecedent basis for this limitation in the claim. The limitation should apparently be "a beam emitted from the fourth optical fiber".

8. Claim 14 recites the limitation "the at least one of the optical fibers" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

10. Claims 1-3, 13, and 15-20 are rejected under 35 U.S.C. 102(e) as being anticipated by *Mills et al (US 6,650,804 B2)*.

11. Regarding claim 1, Mills et al teach an optical switch as shown in figure 3 including first (38-4), second (38-3), and third (38-2) optical fibers disposed generally

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parallel to each other as shown in figure 3. The switch includes first guiding means (40d and 40c) non-movably mounted in front of a tip portion of the optical fibers for guiding a beam of light emitted from the first optical fiber (38-4) to the second optical fiber (38-3) along a first optical path disposed between the tip portion of the first optical fiber (38-4) and the tip portion of the second optical fiber (38-3). The switch includes a second guiding means (40b and 42e) mounted for undergoing movement (portion 42e is movable) to a position in front of the tip portions of the optical fibers for guiding the light beam emitted from the first optical fiber (38-4) to the third optical fiber (38-2) along a second optical path disposed between the tip portion of the first optical fiber (38-4) and the tip portion of the third optical fiber (38-2). The length of the first optical path is substantially equal to the length of the second optical path. Upon inspection of figure 3, it can be seen that the intervals at which the optical fibers are spaced (relative to their optical axes) do not have to be equal. In fact, only the distance between 38-4 and 38-3 (herein referred to as distance A) and the distance between 38-2 and 38-1 (herein referred to as distance C) must be equal for the path lengths described above to be equal. The interval between 38-3 and 38-2 (herein referred to as distance B) must be equal to the horizontal distance between the mirrors which does not have to be equal to distances A and C. Furthermore, if distance B is only slightly different (by a small amount with respect to the horizontal) from distances A and C, the tip portions of the optical fibers would still lie along an approximately straight line disposed in a diagonal direction through the figure.

12. Regarding claim 2, for the purposes of this rejection under 35 U.S.C. 102(e), the limitations discussed in the rejection of this claim under the second paragraph of 35

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U.S.C. 112 were interpreted by the examiner as follows. The limitation “the plurality of optical fibers” was replaced with “the switch” so as to read “An optical switch according to claim 1; wherein the switch further comprises at least a fourth optical fiber”. The limitation “a straight line” was understood to mean “the straight line” referred to in claim 1. Mills et al teach an optical switch as discussed above in reference to claim 1. Mills et al also teach that the switch includes a fourth optical fiber (38-1) having a tip portion along the same line as discussed above in reference to claim 1. The switch also includes a third guiding means (40a and 42a) non-movably mounted (portion 40a is non-movable) in front of the tip portions of the optical fibers for guiding a beam emitted from the fourth optical fiber (38-1) to the third optical fiber (38-2). The switch also includes a fourth guiding means (40a and 42b) mounted for undergoing movement (portion 42b is movable) to a position in front of the tip portions of the optical fibers for guiding the beam emitted from the fourth optical fiber (38-1) to the second optical fiber (38-3).

13. Regarding claim 3, Mills et al teach an optical switch as discussed above in reference to claim 2. The third guiding means guides the beam emitted from the fourth optical fiber to the third optical fiber along a third optical path disposed between the tip portion of the fourth optical fiber and the tip portion of the third optical fiber and the fourth guiding means guides the beam emitted from the fourth optical fiber to the second optical fiber along a fourth optical path disposed between the tip portion of the fourth optical fiber and the tip portion of the second optical fiber. The length of the at least one of the fourth optical path and the third optical path is substantially equal to the length of each of the first and second optical paths. This can be seen by inspection of figure 3.

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14. Regarding claim 13, Mills et al teach an optical switch as discussed above in reference to claim 1. The first guiding means (40c and 40d) comprises a plurality of first mirrors (40c and 40d) disposed at an angle of 45 degrees with respect to an optical axis of the optical fibers. The second guiding means (40b and 42e) comprises a plurality of second mirrors (40b and 42e) disposed at an angle of 45 degrees with respect to the optical axis of the optical fibers when the second mirrors are disposed at the position in front of the tip portions of the optical fibers (see column 1, lines 62-67 of Mills et al).

15. Regarding claim 15, Mills et al teach an optical switch as discussed above in reference to claim 1. The second guiding (40b and 42e) comprises a plurality of mirrors. Mills et al also teach that the mirrors can be controlled by a control circuit (shown in figure 2 as 10a-1) to adjust the direction of the beam emitted from the first optical fiber to the third optical fiber along the second optical path (see column 3, lines 6-12 of Mills et al).

16. Regarding claim 16, Mills et al teach an optical switch as discussed above in reference to claim 1. Figure 5 of Mills et al shows an optical switch device comprising plural optical switches as described above in reference to claim 1. The switches are disposed relative to one another so that an optical axis of each of the optical fibers of the optical switches are disposed generally parallel to one another.

17. Regarding claim 17, Mills et al teach an optical switch as shown in figure 3. The switch comprises a main body and at least first, second, and third optical fibers (38-4, 38-3, 38-2) mounted on the main body and disposed generally parallel to each other with tip portions of the optical fibers disposed along an approximately straight line that runs diagonally with respect to the optical axes of the fibers. The switch includes a first

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guiding means (40c and 40d) integrally mounted on the main body for intersecting a beam of light emitted from the first optical fiber (38-4) and for guiding the beam to a second optical fiber (38-3) along a first optical path having a preselected length. The switch also includes a second guiding means (40b and 42e) mounted on the main body for undergoing movement (portion 42e is movable) relative to the main body to intersect the beam emitted from the first optical fiber (38-4) and to guide the beam to the third optical fiber (38-2) along a second optical path having substantially the same preselected length.

18. Regarding claims 18-20, Mills et al teach an optical switch as discussed above in reference to claim 17. The first (40c and 40d) and second (40b and 42e) guiding means each comprise a plurality of mirrors. Mills et al teach that the optical fibers can be mounted in a plurality of grooves formed in the main body (see column 4, lines 19-28 of Mills et al). Each of the optical fibers has a front part having a tip portion that are disposed generally parallel to one another as can be seen in figure 3.

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Mills et al* (US 6,650,804 B2) as applied to claim 3 above, and further in view of *Hill* (US 6,542,656 B1).

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21. Regarding claim 4, Mills et al teach an optical switch as discussed above in reference to claim 3. Mills et al. does not teach that the optical switch comprises an optical communication component of an add-drop system where the first optical fiber is set to IN and one of either the second or third optical fiber is set to OUT, and the other is set to DROP, and where the fourth optical fiber is set to ADD. Figure 3A of Hill teaches an optical switch comprising an optical communication component of an add-drop system with a first optical fiber set to IN, a second optical fiber set to OUT, a third optical fiber set to DROP, and a fourth optical fiber set to ADD. It would have been obvious to one of ordinary skill in the art at the time of invention to use the optical switch of Mills et al. in the optical communication of an add-drop system as taught by Hill for the purpose of creating a “high performance add-drop optical switch” (column 2, lines 42-44 of Hill).
22. Regarding claims 5 and 6, Mills et al in view of Hill teach an optical switch as discussed above in reference to claim 4. Mills et al do not teach that the optical path from the fourth optical fiber, set to ADD, to the second or third optical fiber, set to DROP, is interrupted or that it has a path length different from the other optical paths. Hill teaches an optical switch as shown in figure 3A of Hill where the optical path from a fourth optical fiber set to ADD (340) to a second or third optical fiber set to DROP (350) is interrupted on the way. It would have been obvious to one of ordinary skill in the art to modify the switch as taught by Mills to have the optical path from ADD to DROP interrupted (and thus result in a different path length) as taught by Hill for the purpose of minimizing components needed for the switch to operate since it is known in the art that the beam from DROP to ADD is “only a nuisance to be absorbed if necessary” (see Tomlinson, column 6, lines 33-34).

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23. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Mills et al* (*US 6,650,804 B2*) as applied to claim 1 above, and further in view of *Jing* (*US 6,259,835 B1*).

24. Regarding claim 14, Mills et al teach an optical switch as discussed above in reference to claim 1. Mills does not teach the use of a lens, arranged between the optical fibers and the mirrors, for converging a beam propagated within an optical fiber or for changing the beam to parallel light. Jing teaches “a plurality of lenses ... provided adjacent to the terminations of the input and output optical fibers to collimate light on the respective optical paths” (column 3, lines 5-7 of Jing). It would have been obvious to one of ordinary skill in the art at the time of invention to place the lenses at the terminations of the input and output optical fibers (as taught by Jing) of the optical switch taught by Mills for the purpose of collimating the light traveling between the optical ports because “light transmitted from an optical fiber termination tends to disperse as it travels into free space beyond the termination” (see column 5, lines 8-12 of Jing).

Allowable Subject Matter

25. Claims 7-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

26. The following is a statement of reasons for the indication of allowable subject matter:

27. Claims 7, 9, and 11 are allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious an optical switch wherein the second and fourth guiding means comprise a total of at least four mirrors

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mounted for simultaneously undergoing movement to a position in front of the tip portions of the optical fibers in combination with the rest of the claimed limitations.

28. Claims 8, 10, and 12 are allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious an optical switch wherein the second and fourth guiding means comprise a total of two mirrors mounted for simultaneously undergoing movement to a position in front of the tip portions of the optical fibers to cooperate with at least one of the mirrors of the first and third guiding means for guiding the beam emitted from the first optical fiber and the beam emitted from the fourth optical fiber along the second optical path and the fourth optical path, respectively in combination with the rest of the claimed limitations.

Response to Arguments

29. Applicant's arguments filed on 11/15/2004 have been fully considered but they are not persuasive. Mills et al does in fact teach that the tip portions of the optical fibers lie along an approximately straight line. This line runs in a diagonal direction with respect to the optical axis of the optical fibers. The applicant also fails to define in the specification the bounds of an "approximate straight line".

Conclusion

30. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek L Dupuis whose telephone number is (571) 272-3101. The examiner can normally be reached on Monday - Friday 8:30am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Derek L. Dupuis
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